

DRAFT Attachment 4-WRD 10.06
Hazard Analysis Guidelines for Risk Factors 7-8,
Highly Repetitive Motion

Department of Labor and Industries
WISHA Services Division

This document will assist inspectors in reviewing work sites where caution zone jobs have been identified. The inspector does not have to evaluate every job, but can use the following strategy for representative sampling. Inspectors will use Appendix B of the rule (WAC 296-62-05174) to evaluate whether there are hazard zone jobs. However, the employer has the option to use an analysis tool other than Appendix B. Some acceptable methods of alternate analysis are identified with each risk factor; in cases where the employer is relying upon either a listed alternative or another alternative, the inspector will need to request that an ergonomist assist them in these inspections.

This attachment contains the following sections to assist inspectors in making their determinations:

- Typical clues to recognize Highly Repetitive Motion
- Typical jobs where hazard zone risk factors of Highly Repetitive Motion are found.
- Tips on measuring Highly Repetitive Motion
- Examples of acceptable methods of hazard analysis when using the general approach
- Typical controls chart
- Common questions for Highly Repetitive Motion

The caution zone criteria for Highly Repetitive Motion are:

- Repeating the same motion with the neck, shoulders, elbows, wrists, or hands (excluding keying activities) with little or no variation every few seconds more than 2 hours total per day
- Performing intensive keying more than 4 hours total per day.

The hazard zone criteria risk factors for Highly Repetitive Motion per Appendix B (WAC 296-62-05174) are:

- Neck, shoulders, elbows, wrists, hands-**using the same motions** with little or no variation every few seconds (excluding keying activities)
 - No other risk factors-more than 6 hours total per day
 - Wrists bent in flexion 30 degrees or more, or in extension 45 degrees or more, or in ulnar deviation 30 degrees or more AND high forceful exertions with the hands-more than 2 hours total per day
- Neck, shoulders, elbows, wrists, hands-**intensive keying**
 - Awkward posture including wrists bent in flexion 30 degrees or more, or in extension 45 degrees or more, or in ulnar deviation 30 degrees or more-more than 4 hours total per day.
 - No other risk factors-more than 7 hours total per day.

Typical clues to recognize the risk factor: Highly Repetitive Motion

- Look for motions that are repeated once every half-second to about once every four seconds.
Exceptions:
 - Intensive keying, where finger motions need to be much more rapid than once every four seconds (see the Intensive Keying section below), and
 - Repetitively raising the hands overhead or elbows above the shoulder, which can be repeated as seldom as twice a minute may still reach the hazard level (see Awkward Postures for more on this risk factor)
- Workers are able to meet the pace required, but must focus intently on their work to keep up. There will be rapid, steady motion with no significant pauses. There may be some brief pauses, but more than 50% of the job cycle will be spent in motion.
- Machine-paced or piece rate work often require highly repetitive motion.
- Jobs where hand tools are used instead of power tools often involve highly repetitive motion.
- "Using the same motion," means that the movements involve the same muscle groups. Motions do not have to be identical to require the use of the same muscles. An example of this might be repetitive reaching. This activity involves the muscles of the upper arm and shoulder, regardless of whether the worker is reaching up, down, sideways or backwards. One of the most common motions is grasping with the hands or fingers to pick up objects. Even though the other movements in the job may be different, grasping always uses the muscles in the hands and forearms.

Typical clues to recognize the risk factor: Intensive Keying

- Look for constant motion at the keyboard, rather than short bursts of input followed by searching or reading at the monitor (also known as intermittent keying, interactive communication, data acquisition)
- Intensive keying can be detected by sounds as well as sight. An unbroken stream of clicking sounds coming from a computer is a possible sign.

Typical jobs where Highly Repetitive Motion CZJ/HZJ risk factors are often found:

Risk Factors	Typical Jobs
Highly Repetitive Motion	<ul style="list-style-type: none"> • Assembly line work • Agricultural harvest • Manual packing of boxes • Feeding parts into a machine • Barista at a busy espresso stand • Grocery store checkout • Painting walls and ceilings using a brush or roller
Intensive keying	<ul style="list-style-type: none"> • Medical or legal transcription • Data entry • Word processing • Court reporter • Accountants or bookkeepers using the 10-key

Tips on measuring the Highly Repetitive Motion risk factors:

- The duration of exposure for highly repetitive motion is the actual time spent making motions every few seconds. This is best determined through representative sampling of typical job tasks. Also, see the special notes for highly repetitive motion combined with hand force, awkward wrist posture, or both under the Combined Risk Factors section.
- The duration of exposure for intensive keying is the actual time with the fingers making keying motions. This is best determined through representative sampling of typical job tasks. Also, see the special notes for intensive keying combined with awkward wrist posture under the Combined Risk Factors section.
- For short bursts of activity followed by short rest periods, use the following guideline to decide if it is highly repetitive motion or not. If the rest period is a longer duration than the short burst of activity, then it does not count as highly repetitive motion.

Examples of acceptable methods of hazard analysis for Highly Repetitive Motion risk factors (acknowledged by the general performance approach within the rule):

- ACGIH Hand Activity Level (HAL) Threshold Limit Value (TLV)
- Job Strain Index
- UAW-GM Risk Factor Checklist

It is acceptable for an employer to have used any of these methods to assess highly repetitive motions for the job in question. There may also be other assessment methods not listed here that would be acceptable. The inspector - consultant will need to ask for the results of the assessments. Contact the ergonomists at Policy & Technical Services for assistance. Inspectors do not need to know how to do these assessments nor how to interpret them.

Typical Controls Chart for Highly Repetitive Motion:

Risk Factor	Typical Control
Highly Repetitive Motion	Eliminate unnecessary motions
	Use power tools instead of hand tools
	Automate the repetitive task
	Job enlargement to reduce duration
	Job rotation to reduce duration
Intensive keying	Use job enlargement or rotation to reduce duration
	Use macros, software fixes to automate repetitive tasks
	Adjust or improve the workstation to fix any awkward postures

Commonly asked questions for Highly Repetitive Motion:

(1) Would assembly work that includes repeated performance of a sequence of different hand tasks fall within the category of highly repetitive motion?

If the assembly involved similar motions using similar muscle groups occurring every few seconds, then it would be highly repetitive. While many motions can vary in terms of the upper arm muscles used, and therefore each motion looks different, keep in mind that any task that requires grasping with the hands will require use of the forearm and hand muscles. It is often the repetitive grasping motions that would be covered.

(2) Does intensive keying mean continuous keystrokes or total keystrokes? In other words if the operator keys intensively for short bursts and stops for an equivalent time, e.g. 2 minutes typing 2 minutes not, repetitively through the day is that intensive keying?

Intensive keying refers to continuous keystrokes, although it does not have to be four hours of absolutely non-stop keying to qualify. Interactive computer work, such as looking up records or modifying some fields in a database would not be generally considered intensive keying. The example of 2 minutes on, 2 minutes off would not qualify as intensive keying. Word processing, data entry (words or numbers), and transcription were chosen as examples because those jobs tend to be continuous in nature.